

A Trunking Communications Primer

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*By William Lutz, Radio System Administrator, Bureau of Purchasing, City of Camden
Department of Administration, Camden, New Jersey*

The powerful marriage of computers and radio communications created a new child of the 21st century: trunked radio communications. Trunked communications allot multiple users to all available channels/frequencies. Conventional radio communications limits user access to their assigned channel grouping (channel 1 to repeater 1, channel 2 to repeater 2, etc.), whereas trunking allows full implementation of all available channel frequencies at any given moment.

In trunking, "talkgroups" (the groups of radios users speak to and from) are the norm, rather than channels. Employing radios programmed to their specific needs, users are not limited to the number of channel sets their system possesses. Indeed, in many instances, a five-channel radio system can carry over 3,000 user-specific talkgroups. Each trunked radio is individually programmed via an in-house computer (usually a laptop).

Key Advantages

Security and flexibility through user-specific programming. Each trunked radio holds a computer so the user can program how and with whom each and every radio can communicate. Each trunked radio thus has a "personality" that can be duplicated or specified. Trunked communications merge computer and radio programming. Groups of radios can be programmed by creating "radio profiles" -- often in minutes. Vice, special operations, tactical or other units can be programmed so unit members can speak to one other without unauthorized eavesdropping or access. Similarly, supervisors can speak to many units either simultaneously or individually. Trunked radio communications also enable secure encrypted communications.

Rapid, controlled communications. Trunked communications employ precision computer programming and control; the results are multi-fold. Radio response time is tremendously enhanced; waiting time is drastically reduced. Users are "queued" and stored in computer memory, which is programmed by the system manager to recognize which user of what agency holds priority and importance.

Trunking controls to whom and for how long each user can speak, as well as the inherent priority each user possesses. Thus, a trunked system can be programmed to prevent excessive holdtime. Public safety can be programmed to the highest level of priority, without necessarily dumping other agencies.

Inherent data communications capability. Trunked radio communications are ideally suited for data communications. MDTs and AVLs, along with a host of other data transmission routines, are readily served through trunked communications. MDTs are currently fully used by public safety agencies, allowing for instant access to NCIC and SCIC. Data transmission enables other units and personnel -- risk managers or public safety officials -- to employ field laptops for building and/or ground look-up information on hazardous waste materials or other concerns.

Dynamic regrouping. In emergencies, trunked radio systems can be pre-programmed with a series of routines to be instantly activated when called upon. A locale may, for example, require that all fire and police units be pre-programmed into a hazardous waste material emergency so that radios that normally would not communicate with one another may do so when necessary. Trunked communications also allow radios to be programmed with emergency notification. When public safety officials seek immediate help -- a firefighter trapped in a burning building or a police officer calling for an assist -- a button can be programmed so the user in question can be readily displayed and a call automatically sent to dispatch.

I-Call. The I-call (individual radio call) refers to a user communicating directly with another user within his talkgroup. Similarly, a supervisor can communicate privately with his individual command group members.

Radio Frequencies

Higher-band frequencies (800 to 900 MHz) are ideally suited for trunked radio communications, owing to their inherent quality. They conduct building penetration and reinforced signal propagation (depending upon the permitted operating wattage levels). Dual voice/data frequencies are choice frequency sets to possess. Digital communications converts analog voice to digital signaling for clear voice, data resonance and enhanced signal reliability. They do not require dedicated, specific channels for specific access. Overall, higher-band frequencies are ideally suited for digital communications, enabling computer-to-computer data networking (SCIC, NCIC, MDTs, AVLs) as well as encrypted communications.

Recent technological advances also allow for trunked radio communications at the lower band frequencies. However, the rule of thumb is: the higher the frequency the greater the signal propagation. Lower-band trunking systems have many of the trunking features one would expect, but higher-band frequencies typically offer greater inherent advantages.

Key Considerations

There are a number of key issues to keep in mind where trunked communications are concerned:

Talk acknowledgment. Users must adjust to using their radios in a new way: waiting for radio acknowledgment before talking.

Radio logistics. In the past, a radio was a radio. Trunked radios reflect specific personalities and thus must be grouped together. This situation can be exacerbated if a system is too user-specific or too detailed in terms of talkgroups. Keep the number of "personalities" few and simple; radios should be tailored to meet the needs of the group or unit, rather than those of each individual user.

Poor planning. The way in which a system is programmed today will affect the department for several years, if not the lifetime of the radio system. A wise administrator plans carefully and implements decisively. Determine both current and future needs, and leave sufficient flexibility within the system for future expansion and changes.

The next generation. Do not be "generation gapped" (intimidated by computers or trunked radio systems). A system is designed to serve the user's needs -- not the other way around.

Trunked radio systems offer tremendous powers for public safety entities if we can just use them to their full advantage.

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Contact Information:
International Assn of Chiefs of Police
515 North Washington St.
Alexandria, VA 22314-2357
Phone: (703) 836-6767
Fax: (703) 836-4543

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